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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/722,812	11/26/2003	Se-Hwan Son	MUTU15.001AUS	8128
30827	7590	05/05/2006	EXAMINER	
MCKENNA LONG & ALDRIDGE LLP			YAMNITZKY, MARIE ROSE	
1900 K STREET, NW			ART UNIT	
WASHINGTON, DC 20006			PAPER NUMBER	

1774
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DATE MAILED: 05/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/722,812

Applicant(s)

SON ET AL.

Examiner

Marie R. Yamnitzky

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 13 February 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-46 is/are pending in the application.
- 4a) Of the above claim(s) 31-40 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-30 and 41-46 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>rec'd 26 Nov 2003</u> . | 6) <input type="checkbox"/> Other: _____  |

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1. Applicant's election with traverse of the species comprising the combination of features A(i), B(i), C(ii), D(i), E(ii) and F(i) (features as set forth in the election of species requirement) in the reply filed on February 13, 2006 is acknowledged. The traversal is on the ground(s) that two claims directed to different species must cover two separate embodiments, and that the examiner has confused breadth with species. This is not found persuasive. The present claims, in totality, cover numerous different species of electroluminescent devices. Some individual claims cover a few species, while other claims cover many species, with no individual claim being a true generic claim (i.e. generic for all species covered by the claims in totality). Claims 1-16, 18-30 and 41-46 read on the elected species. The elected species was used as the starting point for search and examination purposes. Prior art relevant to claim 17 was found in the prior art search, therefore claim 17 has also been examined.

The requirement is still deemed proper and is therefore made FINAL.

2. Claims 31-40 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected species, there being no allowable generic or linking claim.

Applicant timely traversed the restriction (election) requirement in the reply filed on February 13, 2006. Applicant is requested to note that upon allowance of a generic or linking claim, one or more of the withdrawn claims may be subject to examination. For example, if a claim drawn to a device comprising a compound of Formula I is found to be allowable, claim 34 will be subject to examination if claim 34 includes all the limitations of the allowable claim.

3. Claims 9-11, 16, 19-22, 26-30 and 41-45 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 9: The limitations imposed by the recitation that the functional layer “substantially contacts” the anode are not clear.

Claims 10-11: The limitations imposed by the recitation that the anode is made “substantially” of one or more conductive materials are not clear.

Claim 16: It is not clear if an anode that comprises a transparent material is required to be a transparent anode.

Claim 19: It is not clear if a cathode that comprises a transparent material is required to be a transparent cathode.

Claim 20: It is not clear if an anode that comprises an opaque material is required to be an opaque anode.

Claims 21-22: It is not clear if an anode that comprises a reflective material is required to be a reflective anode. Further, with respect to claim 22, the scope of “substantially all wavelengths of visible light” is not clear (emphasis added).

Claims 26-30: It is not clear if an anode that comprises a substantially reflective material is required to be a reflective anode. The limitations imposed by the term “substantially” in the phrase “substantially reflective” are also not clear.

Claims 41 and 43-45: The scope of “substantially equal” is not clear. It is not certain how much variation is allowed between the work functions of the anode material and cathode

material that have “substantially” equal work functions. Further, with respect to claim 42, since the anode and cathode may each comprise more than one material, it is not clear if all anode materials must be the same as all cathode materials, or if it is sufficient for at least one material in the anode and cathode to be the same.

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1, 2, 10, 12, 13, 15-17, 19-23 and 25 are rejected under 35 U.S.C. 102(b) as being anticipated by Ueno et al. (US 6,436,559 B1) as evidenced by Tang et al. (US 4,769,292).

See the entire patent to Ueno et al. In particular, see formulae (4), (5) and (6) in column 4, see c. 23, l. 42-60, and see Example 1 in c. 24.

Ueno's compounds of formulae (4), (5) and (6) are compounds of present Formula I. A 20 Å (2 nm) thick layer of the compound of formula (5) is utilized as an electron injection layer in the electroluminescent device of Ueno's Example 1. The anode of the Example 1 device is a transparent ITO (indium tin oxide) anode. The device of Example 1 also comprises a substrate,

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with the anode positioned between the substrate and the layer of the compound of formula (5), and comprises further layers between the anode and the layer of the compound of formula (5).

Indium and tin are both materials having a work function not greater than 4.5 eV, and within the range set forth in present claim 2, as evidenced by Tang et al. (see the tables in columns 40 and 42 of the Tang patent). The examiner notes that while the rejected claims require the anode to comprise a material having a work function not greater than 4.5 eV, the claims do not require the anode, as whole, to have a work function not greater than 4.5 eV. Even if the claims did require the anode to have a work function not greater than 4.5 eV, Ueno's teaching that the anode may be made of nickel, cobalt or vanadium alone anticipates an anode have a work function not greater than about 4.5 eV and within the range of present claim 2, as evidenced by Tang et al. (see the Table in c. 42 of the Tang patent).

With respect to present claim 19, Ueno et al. teach that the cathode may comprise ITO.

With respect to present claims 20-23, platinum and nickel are among the disclosed materials for the anode.

6. Claims 1-10, 12-17 and 25 are rejected under 35 U.S.C. 102(b) as being anticipated by Son et al. (WO 01/49806 A1) as evidenced by Tang et al. (US 4,769,292).

See the entire Son et al. publication. In particular, see Fig. 1, page 5, line 10-p. 6, l. 8, p. 6, l. 21-p. 10, l. 4 and p. 12, l. 14-p. 14, l. 12.

Son et al. describe electroluminescent devices comprising a compound of present Formula I. In the devices of Son's examples, the compound of present Formula Ia is used. The

compound of present Formula Ia inherently meets the limitations recited in present claims 3-6.

The devices of Son's examples have a transparent ITO (indium tin oxide) anode. The exemplary devices also comprise a substrate, with the anode positioned between the substrate and the layer comprising the compound of Formula Ia. The devices further comprise a light-emitting layer positioned between the cathode and the layer comprising the compound of Formula Ia.

Indium and tin are both materials having a work function not greater than 4.5 eV, and within the range set forth in present claim 2, as evidenced by Tang et al. (see the tables in columns 40 and 42 of the Tang patent). The examiner notes that while the rejected claims require the anode to comprise a material having a work function not greater than 4.5 eV, the claims do not require the anode, as whole, to have a work function not greater than 4.5 eV.

With respect to present claim 10, while Son's exemplary devices do not have an intervening layer between the anode and the layer comprising the compound of Formula Ia, Son's disclosure that the compound may be used in the hole-transporting layer (15) of a device having the structure of anode (13)/hole-injecting layer (14)/hole-transporting layer (15) anticipates the device structure of claim 10.

7. Claims 41, 42 and 45 are rejected under 35 U.S.C. 102(b) as being anticipated by Namiki et al. (US 5,457,565).

See the whole patent. In particular, see Fig. 3, column 4, lines 3-11 and c. 6, l. 8-10.

8. Claim 46 is rejected under 35 U.S.C. 102(b) as being anticipated by Egusa et al. (US 5,294,810).

The present disclosure states that “virtual electrode” refers to “charge carrier accumulation in an internal area of an electronic device”. Accordingly, the requirement for “means” for forming a virtual electrode within the anode contacting layer and/or cathode contacting layer as recited in present claim 46 is considered to be met by device structures that result in charge carrier accumulation in one or more of these layers. Egusa et al. disclose organic electroluminescent devices comprising an anode, a cathode, and multiple organic layers between the anode and cathode. Egusa et al. teach charge carrier accumulation in an internal area of an organic electroluminescent device. See the patent in its entirety as descriptions of device structures providing charge carrier accumulation are found throughout the patent. For example, see the abstract and column 3, line 36-c. 4, l. 12. Various of Egusa’s described embodiments anticipate the organic electroluminescent device of present claim 46 having means for forming a virtual electrode within a layer contacting the anode and/or within a layer contacting the electrode.

9. Claim 46 is rejected under 35 U.S.C. 102(e) as being anticipated by Gupta et al. (US 6,963,081 B2).

The present disclosure states that “virtual electrode” refers to “charge carrier accumulation in an internal area of an electronic device”. Accordingly, the requirement for “means” for forming a virtual electrode within the anode contacting layer and/or cathode



contacting layer as recited in present claim 46 is considered to be met by device structures that result in charge carrier accumulation in one or more of these layers. Gupta et al. disclose organic electroluminescent devices comprising an anode, a cathode, and multiple organic layers between the anode and cathode. Gupta et al. teach charge carrier accumulation in an internal area of an organic electroluminescent device. See the patent in its entirety. For example, see Fig. 5 and column 11, lines 11-51 for description of a device meeting the limitations of a device comprising means for forming a virtual electrode within both the anode contacting layer and the cathode contacting layer. Devices comprising means for forming a virtual electrode within only one of the anode contacting layer or cathode contacting layer are described elsewhere in the patent.

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 1-30 and 41-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Son et al. (WO 01/49806 A1) as applied to claims 1-10, 12-17 and 25 above, in view of Tang et al. (US 4,769,292).

In the electroluminescent device examples of Son et al., ITO is utilized as an anode. Tang et al. teach that cathode or anodes may be made of transparent or opaque materials (one of ordinary skill in the art would recognize that opaque materials may also be reflective), and teach

that metals used for anodes generally have a work function of greater than 4 eV (e.g. see c. 39, l. 44-c. 42, l. 40). It would have been within the level of ordinary skill of a worker in the art at the time of the invention to select suitable materials for the anode and the cathode of Son's device from known materials based on knowledge in the art, such as the teachings of Tang et al. Based on the teachings of Tang et al., for example, one of ordinary skill would have been motivated to select anode materials within the upper portion of the range set forth in present claim 2, and anode materials such as recited in present claims 23, 24 and 28. Based on the teachings of Tang et al., one of ordinary skill in the art at the time of the invention would have recognized that metals having a work function of 4.0 eV or greater as used for the anode could also be included in the cathode. Further, different layered structures, such as anode on substrate or cathode on substrate, would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention as these different structures were known in the art at the time of the invention.

12. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

13. Claims 1-30 and 41-45 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-16 and 21-28 of U.S. Patent No. 6,720,573 B2 in view of Tang et al. (US 4,769,292).

The '573 patent claims an organic light-emitting device comprising an anode, a cathode and a compound of present Formula I. Patent claim 5 limits the compound to a compound of present Formula Ia, which inherently meets the limitations recited in present claims 3-6. The '573 patent does not limit the work function of a material of the anode as required by some of the present claims, or limit properties of a material of the anode and/or cathode (e.g. transparent, opaque or reflective) as required by some of the present claims. It would have been within the level of ordinary skill of a worker in the art at the time of the invention to select suitable materials for the anode and the cathode of the '573 device from known materials based on knowledge in the art, such as the teachings of Tang et al. As taught by Tang et al., cathode or anodes may be made of transparent or opaque materials (one of ordinary skill in the art would recognize that opaque materials may also be reflective), and metals used for anodes generally have a work function of greater than 4 eV (thus suggesting, for example, anode materials within

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the upper portion of the range set forth in present claim 2, and anode materials such as recited in present claims 23, 24 and 28). Further, different layered structures, such as anode on substrate or cathode on substrate, would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention as these different structures were known in the art at the time of the invention.

14. Miscellaneous:

In line 3 of claim 41, "cathodes" should read --cathode--.

15. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (571) 272-1531. The examiner works a flexible schedule but can generally be reached at this number from 6:30 a.m. to 4:00 p.m. Monday, Tuesday, Thursday and Friday, and every other Wednesday from 6:30 a.m. to 3:00 p.m.

The current fax number for all official faxes is (571) 273-8300. (Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (571) 273-1531.)

MRY  
May 01, 2006



MARIE YAMNITZKY  
PRIMARY EXAMINER

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